

OPINIONS AND ATTITUDES OF NATIONAL SCIENCE  
FOUNDATION PROGRAM PARTICIPANTS

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1950

Submitted to the faculty of the Graduate School of  
the Oklahoma Agricultural and Mechanical College  
in partial fulfillment of the requirements  
for the degree of  
MASTER OF SCIENCE  
May, 1957

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Institution: Oklahoma A. and M. College Location: Stillwater, Oklahoma

Title of Study: OPINIONS AND ATTITUDES OF NATIONAL SCIENCE FOUNDATION  
PROGRAM PARTICIPANTS

Pages of Study: 33

Candidate for Degree of Master of Science

Major Field: Natural Science

Scope of Study: Any new type of academic venture, however well planned, is certain to be a composite of strengths and weaknesses. The strengths are often taken for granted while the less strong aspects may assume the proportions of salient features of the program. The problem of studying the first National Science Foundation group was divided into two primary phases. First, a year long study of opinions, attitudes and evaluations by the trainees, of various facets of the current program. Second, suggestions from the participants for improvements or changes to be made in future selection methods and programs planning for courses and procedures. A statistical analysis and five year follow-up of participants is planned, but not included in this study.

Findings and Conclusions: A general feeling of antipathy pervaded the group from time to time; catalyzed (sometimes by an especially rigorous series of lectures and at other times by difficult tests. The original placement of most of the group within a single class in mathematics and biology was especially assailed as being unrealistic and arbitrary, considering the diversity of preparatory background. Both of these courses were considered especially praiseworthy by many. The physics courses were held in high regard by most students while the first semester chemistry was berated by a majority for various reasons. Second semester chemistry was rated as greatly improved in many in many respects. Engineering 403 seemed to be missing its objective as far as most of the trainees were concerned. Many students were also dubious as to the worth of the second semester Modern Math. Other courses received variable ratings depending upon student need, preparation, and interest. Participants indicated approval of the avowed aims of the program as well as most aspects of the selection methods used. However, several suggestions were advanced for improvement in class placement and initial advisement. Although considerably disenchanted by the actual program at various times during the year, most members were quite satisfied with the final outcome, although granting that next year's program should be even better.

ADVISER'S APPROVAL \_\_\_\_\_

437070

OPINIONS AND ATTITUDES OF NATIONAL SCIENCE  
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Report Approved:

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Report Adviser

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Dean of the Graduate School

## PREFACE

The action of our Federal Government, acting through the medium of the National Science Foundation in setting up the Supplementary Training Program for High School Science Teachers, is but the first step in a program which in time will involve millions of dollars and influence thousands of persons directly. The writer has watched the need for such a program develop during the past decade and considered it an honor and privilege to be chosen as a participant in the Oklahoma A. and M. Supplementary Training Program during the pilot year 1956-57. Here was an unparalleled opportunity to study such a group and through their help, offer such suggestions and criticisms as might be helpful in developing an even better program for other schools and future years.

Accordingly, the following report is a resume of the opinions and suggestions of the 48 high school teachers who completed the year of work at Oklahoma A. and M. College. A listing of the names of these teachers may be found in the appendix. It is to them, and the future participants of these National Science Foundation programs, that this report is dedicated, for without their cooperation and interest such a study could not have been made. Special thanks also goes to Dr. Zant, our Program Director and his staff for their forbearance and charity in dealing with the "Guinea pigs of 1957". The writer would be remiss in his duty if he did not also mention the one who, through Act of Congress, has made this program possible. This unsung hero is, of course, the U. S. taxpayer.

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## CHAPTER I

### TECHNIQUES AND PROCEDURES

It is not the purpose of this report to discuss interviewing techniques and question phraseology. Much experimentation along these lines was done during the first semester and it was decided that the patterned personal interview would probably be best for the purposes at hand. Also wherever possible direct questioning techniques were used rather than indirect methods. Books have been written on all phases of interviewing and the writer has leaned heavily upon these authors in formulating questions and development of attitudes which would mitigate the influence of the interviewer upon the interviewee. There are many potential sources of error inherent in an interview and it must always be borne in mind that an interview to gain information is only a substitute for more reliable objective facts.

No attempt was made to judge the validity of any opinion made by any individual, since it was felt that one's opinion is always valid. With one or two exceptions, the writer deemed that the participants expressed their real feelings, although even in these cases there is no concrete evidence that this was not the case. All final interviews were privately conducted beyond ear shot of others and lasted from twenty minutes to two hours with an average of about thirty to forty minutes.

An attempt was made following approximately half of the interviews, to cross check for any built-in bias in the questioning procedure. The participant was asked if he knew from the questions asked, what it was

that the interviewer was trying to prove. Without exception, there was a register of surprise and a reply to the effect that they (the interviewees) hadn't realized that a theory was at stake; that they had thought the purpose of the interview had been merely to get their own personal opinion. This of course, was exactly what had been intended, so it is felt that the opinions registered are an accurate reflection of feelings, unaffected by bias of the questioner or questions. It is also of interest to note that a substantial number of persons mentioned that they felt rather more free in expressing their true feelings to this interviewer, than they had in talking to others who had also interviewed them. If true, this may have been due to a certain amount of rapport which had been developed by close association throughout the year.

One further phenomenon of individual expression which is well known to those in this field, is the matter of misjudging of group opinions by individuals. An example was Math 585 during the first semester. Several rather voluble persons so condemned the course that when asked in a group how they liked the course, most other persons would answer to the effect that they thought the course was not suited to the class. However, in private conversations these same persons would say that for themselves, this course was near ideal. Then many of them would hastily add, "I don't think anyone else concurs with me in this opinion, however." Because of this rather common occurrence among people, this interviewer especially stressed the point that he wanted a true picture of the participant, unsullied by group considerations. This is not easily come by in a group of topnotch teachers, since their basic altruism and sense of empathy toward the group as a whole may tend to supersede their own selfish motives much of the time.

The questionnaire included in this report and subsequently discussed, was given during the latter part of March and the first part of April, and does not necessarily reflect attitudes expressed earlier in the year. However, these later opinions are probably more objective in viewpoint and unaffected by any chance of personal gain or loss since only a few weeks of school remained. There was a predominant feeling of dissatisfaction among the group during the early weeks of the first semester, and many expressions of extreme pessimism and some outright vituperation were heard at that time. After the group had become accustomed (or immune) to the pace and the competition, much less grumbling was heard and a more objective view was taken of the whole program. Suggestions which may lessen this sort of situation another year will be found later in this report.

The discussion of the results of the questionnaire which follows may leave the impression that the group has not been satisfied with the total program. This is not the case, although at times some trainees became so obsessed with a particular tree that it blocked their view of the rest of the forest. At such times words are spoken and ideas expounded which in retrospect may seem quite ridiculous and on occasion are even denied. This should be the final proof, if such is needed, that science teachers too, are human and therefore subject to the same foibles and idiosyncrasies as others.



## CHAPTER II

### DISCUSSION OF RESULTS

Proceeding through the questionnaire item by item, these observations and remarks were recorded.

**QUESTION 1** Advisement - It would appear that rather widespread dissatisfaction occurred here in advisement. Most persons mentioned "lack of advisement" as the culprit, not poor advisement, per se. Many mentioned the "let down" from what the literature termed as "individual counseling and course planning" and what they termed as "mass counseling and no consideration of individual differences". Some thought that the type of tests given were of no help in counseling and guidance, while others felt that these tests had not been properly used. All eleven who rated advisement as average did so (they said) because they realized it was a pilot program and would be better next year, while this year the staff was faced with a problem having no precedents. Several mentioned a lack of definiteness on the part of their advisor during the year, but this may have been a seeking to shift responsibility.

**QUESTION 2** Housing - "Satisfactory, considering circumstances of family, college town and lack of public housing," and "college should do something to reserve a bunch of the Veterans Housing units for the group." These two replies sum the bulk of opinion on housing, pro and con.

**QUESTION 3** Stipends - Those who rated them lower than excellent did so in comparison to salaries usually, although expressing satisfaction otherwise.

QUESTION 4 and 6 Pre-enrollment information - Wide variation with most calling it average. "Painted the picture too bright," "They should have told us what to expect," "I didn't think we would all be thrown into the same classes," "They should warn people that this is no picnic" and, "Where is the the time we were supposed to have, to enjoy the things which as a community of scholars, A. and M. has to offer?" Are sample remarks. Many mentioned that it may have been only as they had understood it, but it seemed that the actual Program was much tougher than they had expected, since they had to compete with persons having better backgrounds in many subjects. When called upon later to give specific examples of misleading information (Question 6), a variety of responses was received, a majority of which dealt with course descriptions.

QUESTION 5 Overall rating - Practically all average and above. As to what this may mean grade-wise, refer to Question 24.

QUESTION 7 Course ratings - These ratings represent only those completing the courses. Math 5S5 was rated by most as an excellent course. This rating was no doubt tempered by the fact that many nonmathematics people withdrew from the class. Most of those completing the class had high praise for Dr. Andree and the job he did. (This in contrast to those who withdrew from class.) During the third and fourth week of school this course rated at the bottom among the group. Many mentioned extremely hard work and long assignments, but apparently satisfaction comes with achievement and the passing of time. Math 5Z3 - "I don't know how to rate a class where I don't know what is going on," and "It may be all right, but it won't help me any," were representative remarks. General disappointment was expressed, but a 'wait and see' attitude held many to an 'average'

rating rather than lower. A general air of student lethargy seemed to pervade the class, but whether this was cause or effect is not clear. Other mathematics courses were generally considered good except when taught by certain instructors. All through the Mathematics department it seemed to be the instructor who determined the value of the course to this group, although a few felt they were placed below their ability in Math 123, after dropping Math 5S5.

Physics generally rated quite high. It was the feeling of most participants that Dr. Durbin was sincerely trying to help bridge the gap between his subject and his class. During first semester when many persons felt lost in this class, there was almost no rancor expressed, because of their appreciation of the instructor's efforts. This is a point of paramount importance and no doubt was the 'arrow that turned the tide of battle'. The three "poor" ratings for Physics 124 were turned in by students who had had a student instructor, incompetent in the eyes of these participants.

Biology 5X4 was a "remarkably well organized class, but probably not fitted for the person with no biology background." A few persons with many hours of biological science rated it only "average" or "above average" because it wasn't advanced enough, but most of the biology people had high praise for the staff and the quality of the courses. Almost unanimous agreement was expressed that all of the group should not be required to take this single course in future programs, while many felt that more time spent on fewer areas would improve the course. The endocrinology, bacteriology, and entomology parts were particularly praised in this connection, while the 'one day stands' of several other departments were criticized as being too short for students to "get the feel of the subject".

Those with little or no background felt rather bitter about this course, tempered somewhat by the B which they received. Several others mentioned, "I have to rate this course higher today than I did last fall." There was some controversy over the value of the laboratory period, but a majority were highly pleased with this phase except for an ecology field trip which seemed to serve no educational purpose. This particular criticism was indicative of the mental attitude of the entire group, namely, that they were unhappy when confronted with work which they felt was too difficult for them to master, and conversely, work which they had already mastered or which presented no educational challenge.

All other biology courses were largely electives, although the term is used advisedly since candidates for degrees needed another biological science course to qualify for graduation. A high degree of satisfaction was generally expressed which may reflect a greater interest by the students in subjects of their own choosing.

Chemistry 443 - The low rating which this course received from a substantial majority of those who took it, merits special consideration in this report. It is unfortunate that the group felt this way, but since they did, the interviewer asked for recommendations and specific criticisms. Fourteen persons mentioned the need of a text book which could be used, many classifying the Hildebrand and Powell text as "useless" or "a waste of money" while others thought perhaps the present text might have had some value had the instructor followed it closely. Several suggested that more assignments might have helped, especially if started at the beginning of the year. Eighteen persons criticized the lecture presentation as being rather disorganized and confused, while the same number also criticized the instructor as probably lacking the experience necessary

for this type of group. Eight persons mentioned what they considered a "lack of fairness in grading tests" or "no correlation between material covered in lectures and material tested upon". Twelve students felt the laboratory period was either "a waste of time" or that "the lab instruction was inept". There were seven who criticized the course for not covering new material, while an equal number criticized it for covering "advanced physical chemistry which I couldn't understand and will not use". Several expressed the sentiment that the beginning of the semester was fine but the latter part was not, while an almost equal number had a diametrically opposite view.

In analyzing the reactions and opinions of the group regarding Chemistry 443, several suggestions were presented. First, the class should probably be divided in such a way that all the students have nearly the same preparation in college chemistry. Unfortunately, even if this were perfectly done, it does not remove the inherent differences between individual students themselves. Nonetheless, it would at least enable the instructor to gear his level of teaching to his students. From the tenor of answers, it appears that the instructor conscientiously geared his teaching to the middle of the class and as a result was too high for part of the students and too low for the other half.

Second, it would seem that a good modern text followed generally chapter by chapter would be especially helpful to the student who has not learned, or hasn't the time, to ferret out information on his own initiative. This would eliminate, partially at least, the feeling of being "lost about what to study for a test" and the frustration that such a situation engenders. This would also mitigate the criticism of being dependent upon inaccurate lecture notes. The lack of time was

consistently mentioned as preventing the students from looking up the necessary information from books in the Library and therefore the need of a more definitive assignment policy is indicated, especially in their own text book.

Thirdly, a new laboratory policy which would allow more freedom in choice of experiments or would put the laboratory on a strictly elective basis, might take care of complaints in this department.

Fourth, and possibly the key to the whole situation is the instructor himself. Although roundly criticized by many, these same persons made suggestions which had considerable merit. The summation of these suggestions follow: "For the most part, the mistakes of the instructor were those of inexperience, and are no reflection on his ability or knowledge as a chemist", "Be consistent in grading papers, do not use laboratory assistants for grading, and do not change grades after papers are passed back, unless an obvious error has been made", "Have a well organized set of notes and follow them closely, avoiding 'skipping back'", "Don't start the course too easy or students will resent it when it becomes difficult," "The instructor should not be loaded down with so much research work and other activities that he has no time for adequate lecture preparation and student advisement and help."

It is interesting to note that prior to the second test, Chemistry 443 was rated as the best of the regular National Science Foundation courses offered during first semester. Also mentioned repeatedly was, "I do (or did) my least studying in Chemistry." If this writer may be permitted an opinion of his own at this point, it would be this: Most students are human, and as such, tend to do only those things which seem most pressing at the moment. With no definite written assignments

or daily quizzes to jar them from their chemical lethargy, and with mathematics, biology, and physics vying for all available time, Chemistry 443 was lost in the time shuffle. Not until the results of the second test were known did it become painfully apparent that a last minute 'lick and a promise' was not enough. Yet without the prodding of daily assignments and with time at a premium, many students fell back into the same rut, with the result that each test seemed unreasonably difficult and the rapport between the instructor and his students dropped off rapidly. It might also be well to point out to members of this group that more emphasis is currently placed upon certain aspects of physical chemistry than at the time most of them took their undergraduate work.

Chemistry 5T3 - Generally conceded to be greatly improved over first semester and a valuable course to those taking it. Other chemistry - Rated average to excellent. The paucity of other chemistry courses taken may indicate a general lack of basic interest in chemistry by the group as a whole.

Engineering 403 - "Course is missing its objective", "too much mathematics", "cover fewer things better", "start on a lower, less mathematical plane", "three hours per week wasted", and "the outside speakers were mostly good, but the regular lecture is a 'snow job'." These comments are representative of the reaction to this course. The mostly low ratings which it received may not reflect the true feeling of the class, since many said, "The class is no good, but with no tests and at least a guaranteed B for a grade, I can't complain. I'll call it average (or below average)." A widespread feeling was expressed that the course objective was fine but to reach it a complete reorganization

of methods would be necessary.

Geology 214 - Considered by those who took it as a good elementary course, valuable for the teacher of general science.

Astronomy 323 - Instructor bitterly criticized by most of those who took this course.

Seminar 510 - "Group discussions were good", "waste of time, accomplished nothing", "I don't know what a Seminar is supposed to be like, but I didn't think it would be like this, but I'll call it average", and "should have been able to accomplish more." These observations take in the bulk of the reactions concerning Seminar. A number of persons thought more direction might have been profitable, and a substantial number suggested that this might have been an ideal time for various members of the group, as well as other outside experts, to tell about or demonstrate various methods or techniques with which they have become proficient. Since no other official opportunity for such an exchange of ideas and/or demonstration of methods is available, this idea would merit serious consideration for another year.

Other courses taken by the group and the ratings given them may be found in the Questionnaire Summary in the Appendix.

QUESTION 8 A majority of the group felt adequately prepared in all major areas, considering the particular courses which they had taught. It is indicative of the quality of the group that they all wanted more preparation even in those areas in which they felt adequately prepared for High School teaching. An over-all dissatisfaction in College Education courses was expressed with nineteen volunteering the thought that they had had more than they wanted, considering them as mostly repetitious and valueless.



QUESTION 9 Most participants would prefer some review in subject matter the first semester if it would not involve losing credit toward a Master's Degree. Of thirty-eight persons asked, thirty-six answered to the effect that they would prefer an integrated review if it could be arranged.

QUESTION 10 Despite much furor to the contrary, forty of the forty-eight felt that all persons should be required to take courses in science outside their own special field. A paradoxical comment was made by at least half-dozen mathematics majors, that "Biology people should be required to take mathematics, since they need it, but Mathematics teachers certainly do not need Biology in order to teach Mathematics."

QUESTIONS 11, 12, and 13 These questions dealt with the matter of a Master's Degree. All but four of those who did not already have a Master's Degree, felt it was of "great importance" to receive their Degree from this program or lose considerable prestige back home. For this reason and because of it being a pilot program, thirteen felt that everyone should get a degree this year regardless of subjects taken or grades received, but as a general practice only six were in favor of this policy. Most persons without a Master's Degree said they did work harder because of wanting the degree. Most of the seven who answered negatively to this were students who seemed to work very conscientiously anyway, and received high grades also. Getting the degree had become more important since arrival at A. and M. to quite a few.

QUESTIONS 14, 15, and 16 The most commonly expressed desires of the program were (a) a broader background of subject matter, (b) advanced work in specialty field, (c) strengthening of weak subject matter

areas, and (d) a Master's Degree. They pointed out that these aims coincided with the avowed aims of the National Science Foundation and so they fully expected to have their desires fulfilled. With this in mind fourteen classified the program as a dissatisfaction and nine felt "partially dissatisfied". The per cent of dissatisfaction varied from 0 per cent to 75 per cent with thirty-six placing the actual program as being 0 per cent to 30 per cent off from their expectations.

This compares with a satisfaction rating in Question 24 of 80 per cent or higher by all but four members. It appears from this variation, noted in the questionnaire sequence, that although the program may have lacked 25 per cent to 30 per cent of living up to preliminary expectations, it has turned out to be 80 per cent to 90 per cent satisfactory in the minds of the participants.

Questions 17 through 21 were designed to get the reaction of the present group toward certain problems in selecting and advising candidates for future National Science Foundation programs.

QUESTION 17 An even division of thought was expressed concerning possible use of subject matter proficiency tests in selecting candidates. Most persons apparently took the question to mean that only those with high marks would be selected in this manner. When the interviewer first explained that high achievement marks would not necessarily be required, depending upon the selection committee, most of the interviewees would agree that such tests might be of value, although probably not practical. However, thirty-six of thirty-eight persons questioned felt that such tests would be of vital importance in any pre-enrollment advisement program. A number of the group seemed to feel that some of the tests taken last September, before school started, were of little value,

and a majority expressed what they considered "the lack of use of our pre-enrollment tests in advisement and course placement." There was some comment that such tests properly utilized and in conjunction with other pertinent data concerning the new trainee, could forestall a recurrence of the restlessness which swept over this group early in the first semester.

QUESTIONS 18 and 19 Only about one-third of those interviewed would give transcript grades "much consideration" in selecting candidates, while two-thirds would give "some consideration" to them. Opinion varied from "transcript grades are the only criteria which show what a person actually will do in college courses", to "some of these grades received from small colleges don't mean a thing." A goodly number of persons suggested that the older college grades should have little if any bearing upon being chosen for this type of program. Forty-four trainees would recommend a minimum college grade average as a requisite to acceptance, and these were evenly divided between a 2.0, 2.5, and a 3.0 average. Many pointed out that those with lower averages, such as a 2.0 (C), might actually be in greater need of help than those with higher grade point averages, while others felt it would be foolish to expect success in a Graduate program which requires a 3.0 (B), average if the prospective candidate could not maintain at least that kind of average in undergraduate work.

QUESTION 20 The interviewer was surprised to learn that only one-third of the group would attach "much importance" upon letters of recommendation, and even among these there were six who felt that occasionally less weight should be placed upon these letters. Mentioned prominently as a possible preventative measure against gushy letters

written by personal friends of the applicant were "directed letters of recommendation", or letters from persons designated by the selection committee. It was pointed out also that a letter from the Mayor or banker might be impossible for the teacher in a large city system while in the small town these people might well be personal, bridge-playing cronies of the applicant. Practically all of those queried on this point expressed belief that recommendation letters were potentially very valuable, but the problem was in getting the writers to be completely truthful without personal friendships or animosities becoming influencing factors.

QUESTION 21 A variety of factors was mentioned as contributing to ultimate success within the current program. A composite answer would run something like, "Assume first that the student has the necessary basic intelligence to handle this type of work. Then his mental attitude toward hard academic work, as evidenced by previous college grades, coupled with a sincere desire to improve professionally, determines the degree of success which he will experience." Occasionally mentioned, although not as often as this writer had expected, was the familiar refrain about 'grades not being important; it is what you get out of the course that really counts'. "With the proper attitude, most High School Science Teachers could be successful in this program."

QUESTION 22 The most frequently mentioned highlight of the program was the association with other teachers which the group enjoyed. As might be expected the answers received here ran the gamut from specific courses to abstract ideas. Many answered by saying, "It is difficult to pick out only one or two highlights of such a program, and if you ask me next week I will probably give you a different reply than I will today". It should

be noted again that the interviewer did not give the person being interviewed a list from which to choose in any opinion query.

QUESTION 23 - The low point of the present program seemed to be the early part of first semester. There were a number of causal mechanisms which triggered this situation. In spite of themselves it has become increasingly evident that most of the trainees came to Stillwater with some stardust in their eyes. Numerous studies have shown that teachers tend as a group to be idealists and this very trait beguiled them into idealizing the program before it began. Many pointed a semi-accusing finger at the information sent out previous to enrollment as contributing to this state of mind, and indeed the staff too may have had a trace of celestial light in their eyes concerning the teachers who had been selected. The rather violent reaction to Math 585 by a large number of students seemed to catalyze an adverse temperment toward the whole program initially. Hardly had the academic boats gotten back to an even keel when it was hit by the tidal wave of the first Biology 5X4 test which all but capsized a few. Having sailed the relatively placid waters of teaching for several years, a few members took some ignominious spills before regaining their sea legs. During this time it was very disconcerting to the ego to see some others in each course sailing serenely onward apparently oblivious of the raging tempest which had struck. Situations like this do not engender kindly thoughts for the moment, but 'time heals all wounds' and already a mellowing of attitude has occurred which no doubt will continue until the last vestige of irritation is gone.

QUESTION 24 The grade of 80 per cent to 90 per cent given the total program by forty of the forty-eight participants should be taken as an overwhelming vote of thanks to the staff who planned and executed the

Oklahoma A. and M. program. Many persons have expressed to the writer their personal regret that they had not waxed as elequent in their praise for all the good parts of the program as they had in criticizing the few parts which they felt could be improved somewhat. Again, if the writer may be given the indulgence of a personal opinion at this point, he would express an appreciation to the staff for maintaining an openmindedness toward suggestions for improvements and changes in their courses. With such an attitude on their part the future National Science Foundation groups which come here will be presented with an even better program than the present one.

It is the writer's humble hope that the suggestions contained herein will be considered seriously, as indeed they have been sincerely expressed by all concerned. It is well known that the attitudes that teachers believe their students have do not always coincide with the student's real attitudes. Teachers must recognize this possibility and not take it as a threat to their sincerity and integrity when it occurs. The value of this study lies in its future use in further improving an already outstanding program, planned with intelligence and executed by dedicated men.

## CHAPTER III

### SUMMARY

Fifty high school science teachers arrived in Stillwater with high hopes and aspirations for a year of up-grading in science. The abrupt, disconcerting reality of hard work, long assignments and intense competition with which they were confronted at the beginning of the first semester was an unnerving experience to many. A general feeling of antipathy pervaded the group from time to time, catalyzed sometimes by an especially rigorous series of lectures and at other times by difficult tests. The original placement of most of the group within a single class in mathematics and biology was especially assailed as being unrealistic and arbitrary, considering the diversity of preparatory background. Approximately twenty persons subsequently dropped the first semester Math 5S5, which was pitched on a very high plane and was considered by those who remained as an extremely valuable course in the final analysis. A similar situation prevailed in Biology 5X4 as it effected certain nonbiology teachers. The Atomic and Nuclear Physics courses were held in high regard by most students while the first semester chemistry was berated by a majority for various reasons. Second semester chemistry was rated as greatly improved in many respects. Engineering 403 seemed to be missing its objective as far as most of the trainees were concerned. Many students were also dubious as to the worth of the Modern Math during second semester. Other courses received variable ratings depending upon student need, preparation, and interest.

Participants indicated approval of the avowed aims of the program as well as most aspects of the selection procedures. However, several suggestions were advanced for improvement in class placement and initial advisement. Subject matter proficiency tests were suggested as being a valuable advisement aid if properly used and would lessen the chance of placing a student above or below his ability and training. Although considerably disenchanted by the actual program at various times during the year, most trainees were quite satisfied with the final outcome, although granting that next year's program should be even better.



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**APPENDIX**

## APPENDIX A

### SUMMARY OF QUESTIONNAIRE AND FINDINGS

The following ten pages of this appendix consists of the questionnaire used in this study along with the number of persons answering in the manner indicated. Underlines or quotation marks point out the words of the interviewer and constituted the entirety of suggestions made.

#### Preliminary Remarks

"Please answer the following questions on the basis of how nearly your own personal needs and desires have been met.

"I want only your own individual opinions, regardless of whether you think anyone else agrees with you or not. The value of this study will depend upon you giving a frank, personal evaluation, or opinion, as the case may be. In this way we will be able to see the Program through the eyes of the fifty individuals, rather than through an "average" individual, duplicated fifty times.

"Your name, of course, will not be used in the report. Please feel free to offer any comment, criticism, and suggestions as you go along, since, in this way future participants may benefit from your experience here.

"Generally, or on the average, how would you rate the following parts of the program as far as your own personal needs, desires, expectations, and experiences are concerned. If you feel that a certain part of the program is average in general, but with one or two exceptions, please

note these exceptions. The terms "poor", "average", and "excellent" may be thought of as "low", "medium", and "high" if you prefer, and should be used with the same connotation that you normally associate with these words."

Questionnaire Summary					
	1	2	3	4	5
	(Poor)		(Average)		(Excellent)
1. <u>Advisement</u>	19	14	11	0	4
2. <u>Housing</u>	9	4	9	3	23
3. <u>N.S.F. Stipends</u>	0	0	7	4	37
4. <u>Pre-enrollement printed information regarding program</u>	8	8	22	3	7
5. <u>Overall present Program</u>	1	1	19	17	11
6. "Do you feel that the information sent you before coming to Stillwater was (a) misleading, (b) accurate, (c) some of both?"					
Misleading					5
Accurate					8
Some of both					35
"If (a) or (c), will you give specific example?"					
Physics, description and name					19
Mathematics, description and name					14
Lack of choice of subjects (inflexibility)					7
Degree requirements					6
Courses not suited to individual					5
Engineering course description					4
Lack of individual guidance					4
Biology not modern					3
Chemistry description					3

Lack of available time for association of group 2

Poor quality of instructors 1

7. "Generally, how would you rate the following parts of the Program?

Rate only those subjects taken and not dropped."

	1 ( <u>Poor</u> )	2	3 ( <u>Average</u> )	4	5 ( <u>Excellent</u> )
<u>Math 585</u>	1	0	2	3	22
<u>Math 5Z3</u>	5	6	12	0	2
<u>Math 123</u>	4	0	3	3	3
<u>Math 143</u>	2	0	2	0	1
<u>Math 413</u>	1	0	0	0	4
<u>Other math</u>	0	4	3	3	11
<u>Physics 4X3</u>	1	2	4	9	16
<u>Physics 5X3</u>	0	0	4	4	17
<u>Physics 114</u>	0	0	0	3	2
<u>Physics 124</u>	3	0	1	2	3
<u>Physics 410</u>	0	0	0	0	3
<u>Other physics</u>	0	0	1	3	4
<u>Biology 5X4</u>	7	4	14	8	15
<u>Zoology 323</u>	1	1	6	5	13
<u>Botany 314</u>	0	0	1	0	3
<u>Botany 114</u>	1	0	3	0	1
<u>Botany 424</u>	0	0	1	0	4
<u>Zoology 463</u>	0	0	1	1	2
<u>Zoology 483</u>	0	1	1	4	3
<u>Other Biology</u>	0	1	3	4	19
<u>Chemistry 443</u>	24	9	4	1	1
<u>Chemistry 5T3</u>	2	2	5	2	0

## 7. (Continued).

	1 ( <u>Poor</u> )	2	3 ( <u>Average</u> )	4	5 ( <u>Excellent</u> )
<u>Other chemistry</u>	0	0	6	1	6
<u>Engineering 403</u>	16	10	9	1	2
<u>Geology 214</u>	0	0	2	1	4
<u>Other geology</u>	0	1	2	1	0
<u>Astronomy 323</u>	5	1	1	0	1
<u>Astronomy 104</u>	0	1	1	0	0
<u>Geography 323</u>	0	0	3	1	2
<u>Education courses</u>	1	0	5	2	0
<u>Other courses</u>	0	0	0	2	2
<u>Seminar 510</u>	9	5	22	7	5

8. "Considering your teaching duties before you came here, how would you rate your own background of preparation in the following fields. In other words, for what you were teaching, did you feel that your subject matter background in the following fields was adequate or inadequate. (Do not count this year's work.) An adequate rating does not necessarily mean that you knew all about the subject, but only that you felt that you had enough of it to teach your assigned courses well."

	<u>Adequate</u>	(?)	<u>Inadequate</u>
<u>Mathematics courses</u>	34	1	13
<u>Physics courses</u>	23	5	20
<u>Biology courses</u>	29	2	18
<u>Chemistry courses</u>	24	2	21
<u>General Science courses</u>	37	7	4
<u>Education</u>	45 (19) <sup>1</sup>	1	2

<sup>1</sup>Participant indicated an excess of hours, to the end that subject matter fields had been neglected.

9. "Would you have preferred one semester of intensive review in some fields instead of the full year being spent on advanced work?"
- |                          |                     |
|--------------------------|---------------------|
| Yes                      | 28                  |
| No                       | 19                  |
| Prefer integrated review | 7 (36) <sup>2</sup> |
10. "Do you feel that you should be required to take courses in science subject matter outside your own field of teaching? For example, should a biology instructor be required to take some course in mathematics or a mathematics instructor be required to take some course in biology."
- |                                  |                   |
|----------------------------------|-------------------|
| Yes                              | 40                |
| No                               | 8                 |
| Minimum of 3 to 8 semester hours | (19) <sup>3</sup> |
11. "How important is it to you to get a Master's Degree from this Program?"
- |                     |                     |
|---------------------|---------------------|
| Of no importance    | 5 (5) <sup>4</sup>  |
| Of some importance  | 12 (8) <sup>4</sup> |
| Of great importance | 31 (1) <sup>4</sup> |
12. "Do you feel that everyone should get a Master's Degree if they stay with the Program, regardless of subjects taken or grades received?"
- |     |                     |
|-----|---------------------|
| Yes | 13 (7) <sup>5</sup> |
| No  | 35 (2) <sup>5</sup> |

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<sup>2</sup> Participant indicated that integrated review would be preferred, when this choice was offered by the interviewer. 38 were asked.

<sup>3</sup> Not all participants wanted to suggest a minimum here.

<sup>4</sup> Participants already had a Master's Degree.

<sup>5</sup> Indicates a qualified answer, depending upon circumstances.

13. "Do you work harder because of wanting a Master's Degree from this Program?"	
Yes	28 (1) <sup>4</sup>
No	20 (13) <sup>4</sup>
14. "Personally, what did you most desire of this Program?"	
Broader background of subject matter	17
Advanced work in own field	16
Bring weak areas up to par	12
Master's Degree	11
Review	5
Association of outstanding teachers	4
New concepts in science	3
Methods for teaching science	3
Help to become better teacher	2
Advancement in position	2
Other reasons	3
15. "Did you expect to fulfill this (these) desire (s)?"	
Yes	45
No	0
Hoped so	3
16. "Has the Program been a disappointment to you?"	
Yes	14
No	25
Partially	9
Per cent of Disappointment	
0 - 10	15
11 - 20	7



16 (Continued).

21- 30	14
31 - 40	3
41 - 50	6
75	1
Couldn't rate	2

"For the next several questions, assume that your State University were conducting one of these National Science Foundation Programs next year. You have been asked to serve on the selection and guidance committee because of your experiences here this year. Because of this experience, they will rely heavily upon your judgement in these matters."

17. "Should tests in subject matter proficiency be given before candidates are selected? In other words, would such tests be of value to you in selecting applicants?"

Yes	25
No	23
For advisement after arrival	36 <sup>6</sup>

18. "Should transcript grades be given (a) much, (b) some, (c) no consideration in the selection of candidates?"

Much consideration	17 (2) <sup>5</sup>
Some consideration	30 (2) <sup>5</sup>
(Little consideration)	1
No consideration	0

19. "Would you recommend a minimum over-all college grade average?"

Yes	44
No	4

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<sup>6</sup> Only 38 persons were asked this question.

## 19. (Continued).

"If "yes", what over-all average would you recommend."

C (2.0)	15
C+ or B- (2.5)	14
B (3.0)	14

20. "How much weight would you place upon letters or recommendation,  
(a) much, (b) some, (c) none?"

Much	16 (6) <sup>5</sup>
Some	24 (7) <sup>5</sup>
(Little)	6
None	2

21. "What 1 or 2 factors in the individual, in your opinion, is (are)  
most important in predicting success in this type of Program? These  
factors or qualities need not be confined to those things which can  
actually be measured."

Basic ability - intelligence	25
Persistence - willingness to work hard	21
College grades	12
Sincere desire to improve self	11
True professionalism	10
Emotional maturity - mental attitude	4
Ambition	3
Versatility	3
Willingness to adjust to new situations	3
Mathematics background	3
Subject matter	3
Other factors	6

## 22. "What is (or was) the high-light of the Program in your estimation?"

Association with other teachers	20
Math 5S5	7
Opportunity for advanced mathematics	3
Opportunity for advanced biology	5
Physics 4X3	5
Broader perspective of science	5
Educational opportunity and experience	3
Library facilities	3
Second semester improvement	3
None	3
Other	6

## 23. "What is (or was) the low point of the Program - your main criticism?"

Inadequate guidance, misclassification, and discontentment during first part of year	16
Chemistry 443	11
Heavy load - missed family and social-cultural life	7
Engineering 403	6
Math 5S5	5
Biology 5X4	5
Poor teacher quality and attitude	5
Inflexibility of Program	4
Housing	3
Self-imposed competition	3
None	3
Other	6

24. "If you were to grade this Program, just as you would grade a student, what grade would you give it?"

100	1
95	1
90	14
85	15
80	11
75	1
60	2
50	1
No grade	2

APPENDIX B

LIST OF PARTICIPANTS

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VITA

J. Paul McIntosh

Candidate for the Degree of

Master of Science

Report: OPINIONS AND ATTITUDES OF NATIONAL SCIENCE FOUNDATION  
PARTICIPANTS

Major Field: Natural Science

Biographical:

Personal data: Born near Sargent, Nebraska, December 11, 1924, the son of Clyde H. and Ethel Doty McIntosh.

Education: Attended Stanton County, Nebraska, rural grade schools; graduated from Pilger High School in 1942; received a Bachelor of Science degree from University of Nebraska, College of Agriculture, with majors in Vocational Education and Natural Science, in January of 1950; attended University of Nebraska, Summer of 1950; completed requirements for Master of Natural Science degree in May, 1957.

Professional Experience: Stanton County rural school teacher 1942-43; Vocational Agriculture Instructor from January, 1950 to July, 1953, including one year as Supervising Teacher Trainer for University of Nebraska; Norfolk Junior High instructor, 1955-56.